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COMPUTER NETWORKS (GATE 2023) - REPORTS

OVERALL ANALYSIS COMPARISON REPORT **SOLUTION REPORT**

ALL(33) CORRECT(23) INCORRECT(10) SKIPPED(0)

Q. 11

[Solution Video](#)

[Have any Doubt ?](#)



Consider two hosts H_1 and H_2 connected through an ethernet. Ethernet frames may carry data up to 1500 bytes (i.e. MTU = 1500 bytes). Host H_1 sends TCP segment of size 11830 bytes (including TCP header) to host H_2 . Size of IP header is 20 bytes fixed. And the IPv4 datagram is allowed to fragment. Which of the following is/are correct?

A Total minimum 9 IP fragments will be transmitted.

B Total minimum size of last IP fragment is 1490 bytes.

Your option is **Correct**

C Offset value in last fragment is 1295.

Your option is **Correct**

D Value of HLEN field in IP header of last fragment is 20.

YOUR ANSWER - b,c

CORRECT ANSWER - b,c

STATUS -

Solution :

(b, c)

$$\begin{aligned}
 \text{MTU} &= 1500 \text{ B} \\
 \text{IP header size in each datagram} &= 20 \text{ bytes.} \\
 \text{Available MTU for TCP segment} &= 1480 \text{ B} \\
 \text{Used MTU (without IP header)} &= \left\lfloor \frac{1480}{8} \right\rfloor \times 8 = 1480 \text{ bytes} \\
 \text{Total number of fragments} &= \left\lceil \frac{11830}{1480} \right\rceil = 8 \\
 \text{Data size in last IP fragment} &= 11830 - 1480 \times 7 = 1470 \text{ bytes} \\
 \text{Total size of last IP fragment} &= \text{IPH size} + \text{Data size} \\
 &= 20 + 1470 = 1490 \text{ bytes} \\
 \text{Offset in last fragment} &= \frac{1480 \times 7}{8} = 1295 \\
 \text{HLEN} &= \frac{\text{IPH size}}{4} = \frac{20}{4} = 5
 \end{aligned}$$

[QUESTION ANALYTICS](#)



Q. 12

[Solution Video](#)

[Have any Doubt ?](#)



Consider a IPv4 packet received by a router and following are the possible situations:

- Congestion occurred at router.
- TTL of packet has expired.
- Destination port in packet is unreachable.

For which of the above situations, router respond with ICMP message to source of packet?

A III only

B II and III only

C I and II only

D I, II and III

Your answer is **Correct**

Solution :

- (d)
- Source quench
- TTL expired
- Destination port unreachable

[QUESTION ANALYTICS](#)



Q. 13

Solution video

Have any Doubt ?



Consider two nodes n_1 and n_2 are connected using ethernet (uses CSMA/CD). Let n_1 sends a frame and n_2 also sends a frame. Both frames collide with each other. This collision is 2nd collision for frame of n_1 and 4th collision for frame of n_2 . The probability of successful transmission of frame of n_1 in next transmission before transmission of frame of n_2 is _____. (Round off upto 2 decimal places)

0.84375 [0.84 - 0.85]

Your answer is Correct 0.84

Solution :

0.84375 [0.84 - 0.85]

Ethernet (CSMA/CD) uses binary backoff algorithm in two nodes.

2nd collision for n_1 , 2² choices for n_1 , (0, 1, 2, 3)4th collision for n_2 , 2⁴ choices for n_2 , (0, 1, 2, 15)Cases for n_1 transmit before n_2 without collision

k_{n_1}	k_{n_2}	Number of cases
0	1, 2, 15	15
1	2, 3, 15	14
2	3, 15	13
3	4, 15	12

$$\text{Probability} = \frac{54}{4 \times 16} = 0.84375$$



QUESTION ANALYTICS



Q. 14

Solution Video

Have any Doubt ?



Consider the following fields of a IPv4 header:

I. Header length

II. Time to live

III. Header checksum

IV. Options

Which of the above fields can change on movement of packet from one router to another?

A II and III only

B II and IV only

C I, III and IV only

D I, II, III and IV

Your answer is Correct

Solution :

(d)

If option field length changes then header length will also change.



QUESTION ANALYTICS



Q. 15

Solution Video

Have any Doubt ?



A system uses bit stuffing framing protocol and it uses 8 bit delimiter pattern of 01111110. Let the input bits to this framing protocol is 0111110101111101, then output after bit stuffing is

A 01111101011111001

B 0111110010111111001

C 0111111010111110101

D 0111110010111110101

Your answer is Correct

Solution :

(d)

If continuous 5 1's in input string then add one 0 in string.

```

0 1 1 1 1 1 0 1 0 1 1 1 1 1 0 1
      ↓           ↓
      0           0
01111100101111110101
  
```



QUESTION ANALYTICS



Q. 16

Solution Video

Have any Doubt ?



Which of the following is/are correct?

A In virtual circuit, header of a packet carry a VC number.

Your option is **Correct**

B In virtual circuit, a VC number in a packet does not change when it travel from source to destination via routers.

C In datagram network, a series of packets sent from one end system to another may follow different paths through network.

Your option is **Correct**

D In virtual circuit, the network layer may reserve resources along the path of virtual circuit.

Your option is **Correct**

YOUR ANSWER - a,c,d

CORRECT ANSWER - a,c,d

STATUS -

Solution :

(a, c, d)

VC number changes at each router using the forwarding table.



QUESTION ANALYTICS



Q. 17

Solution Video

Have any Doubt ?



Consider some systems connected using ethernet LAN of rate 80 Mbps. The maximum distance of a system from another system is 500 meter. The propagation speed of data in ethernet LAN is 2×10^8 m/s. The minimum possible size of frame in this network is _____ bits.

400

Your answer is **Correct**400**Solution :**

400

In ethernet,

$$\text{Transmission time} \geq 2 \times \text{Propagation time}$$

$$\Rightarrow \frac{L \text{ bits}}{80 \times 10^6 \text{ bps}} \geq 2 \times \frac{500 \text{ m}}{2 \times 10^8 \text{ m/s}}$$

$$\Rightarrow L \geq 400 \text{ bits}$$



QUESTION ANALYTICS



Q. 18

Solution Video

Have any Doubt ?



The maximum cost of a path in an autonomous system (AS) which uses Routing Information Protocol (RIP) for intra-AS routing is _____.

15

Your answer is **Correct**15**Solution :**

15

15 max path length is default, decided by RIP. Above 15, considered as infinite.



QUESTION ANALYTICS



Q. 19

Solution Video

Have any Doubt ?



Consider a network of 5 routers A, B, C, D, E. Network uses distance vector routing technique. D is connected to A, C and E with costs 9, 2 and 3 respectively. Following are the distance vectors (DV) of A, C and E delivered to node D.

DV of A	
A	0
B	4
C	5
D	7
E	8

DV of C	
A	5
B	8
C	0
D	2
E	3

DV of E	
A	8
B	7
C	3
D	3
E	0

Which of the following DV computed by node D?

A

A	9
B	8
C	2
D	0
E	3

B

A	9
B	10
C	2
D	0
E	6

C

A	7
B	10
C	4
D	0
E	3

D

A	7
B	10
C	2
D	0
E	3

Your answer is Correct

Solution :

(d)

Use this for DV technique (for node D):

Distance to node x (except D) = $\min_{y \in \text{(neighbours of D)}} (\text{Distance of D to } y + \text{DV } y(x))$

DV $y(x)$: Distance of x in DV of y .



QUESTION ANALYTICS



Q. 20

[Solution Video](#)

[Have any Doubt ?](#)



Consider a source S sends a TCP segment of size 2000 bytes (including TCP header) to receiver R over IPv4. R received a IP packet send by S . In packet, M bit is 0 and fragment offset value is 187. The size of data in datagram of other IP packets with same identification value as in above received packet is _____ bytes.



1496

Correct Option

Solution :

1496

M bit is 0, so, no more TCP data after this fragment.

Data size in previous fragmented packets = $187 \times 8 = 1496$ bytes



Your Answer is 504



QUESTION ANALYTICS



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